

Answer to leftover chat room question from *Kristin Y. Rozier's* LEARN/Seedling Seminar presentation, January 13, 2015

Question:

Authority allocation between the electronics and human appears not to be matured for UAS flight over human populated areas and/or near human piloted aircraft. Because UAS technology cannot currently comply with "see and avoid" rules that apply to all aircraft Can you describe who has Command Authority for UAS safety of flight given the presentation and technical challenge of system health management?

Kristin Y. Rozier:

Regarding a specific command authority for UAS, that that has yet to be determined. In the future, i.e., when the FAA issues a clear policy on UAS in the NAS, we expect command authority to have a clearer definition. In general, there are many challenges involved with UAS flight over populated areas given the current state of technology beyond see-and-avoid. For instance, UAS autonomy is often considered brittle, in that failure to one component leads to a complete loss of autonomous function or control of the aircraft. Without a pilot onboard to recover and due to a lack of situational awareness, such failures have potential to result in the loss of the aircraft. As such, UAS overflight of populated areas continues to pose a significant threat to people and property on the ground. Onboard system health management is a promising technology that can help alleviate these concerns, identifying problems in onboard systems before they manifest into larger systemic problems, or identifying failed components immediately so that corrective actions - either by a remote pilot or autonomously - can be undertaken to ensure safe operations. Currently, UAS do not have the capability to assess system health and make deductions in the same way that an onboard human pilot can.

Even more generally, as manned and unmanned aerial systems become more complex, there is a growing difficulty in understanding root causes of anomalous situations based on the information provided to pilots, and a need to process onboard data quickly to identify failed or failing components in a real-time manner. There are many tragic cases in manned commercial flight where anomalous situations were encountered due to a failure of an onboard component, but the inability for pilots to understand what component had failed resulted in them taking incorrect corrective actions that exacerbated the issues and ended with tragic loss of lives. We hope our research will help pave the way towards safer future airborne systems, both manned and unmanned.

Question:

Does the project have a COA Certificate of Waiver or Authorization (COA) for public aircraft on file?

Kristin Y. Rozier:

Yes, we have a COA in place between NASA and the FAA for conducting flight tests on this vehicle.